VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

January 31, 2002

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No. 01-328C
NL&OS/ETS R0
Docket No. 50-339
License No. NPF-7

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNIT 2
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
THIRD INTERVAL INSERVICE INSPECTION PROGRAM

In a letter dated June 13, 2001 (Serial No. 01-328), Virginia Electric and Power Company (Dominion) submitted the inservice inspection (ISI) program for the third interval for North Anna Unit 2, including the associated relief requests.

In a November 20, 2001 telephone conference call with the NRC staff, regarding the ISI program and associated relief requests, additional information was requested. The information associated with those relief requests that may be required prior to the first inservice inspection outage (currently scheduled for fall 2002) was provided in a letter dated December 12, 2001 (Serial No. 01-328B). The requested information associated with the remaining relief requests is provided in the attachment to this letter.

If you have any questions or require additional information, please contact us.

Very truly yours,

S. P. Sarver
Director – Nuclear Licensing and Operations Support

Commitments made in this letter:

1. None

Attachment

A047

cc: U.S. Nuclear Regulatory Commission
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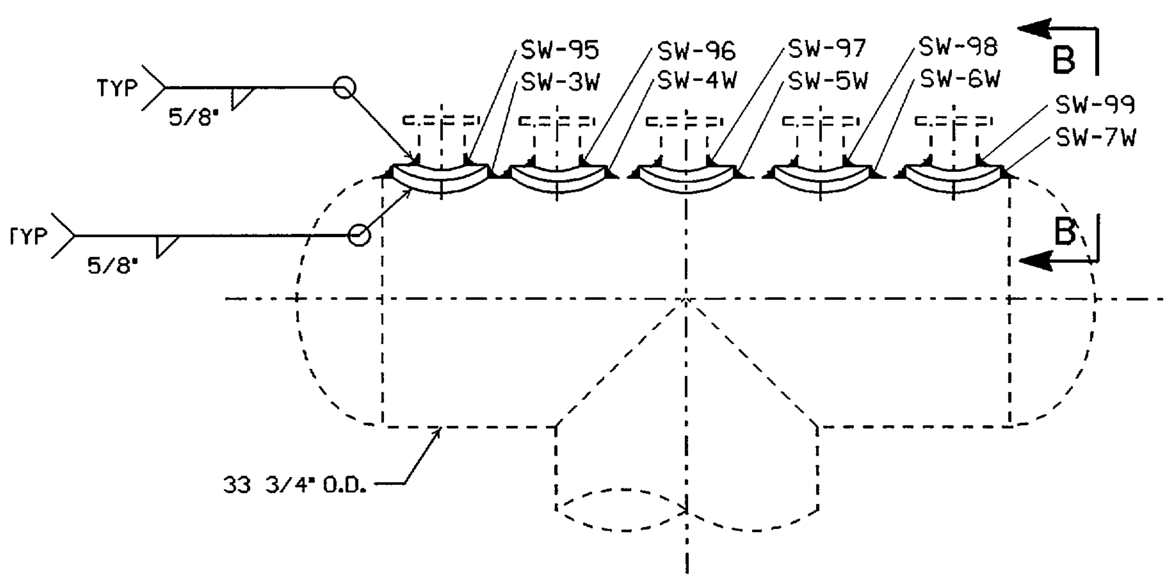
Request for Additional Information
North Anna Power Station Unit 2
Third Interval Inservice Inspection Program

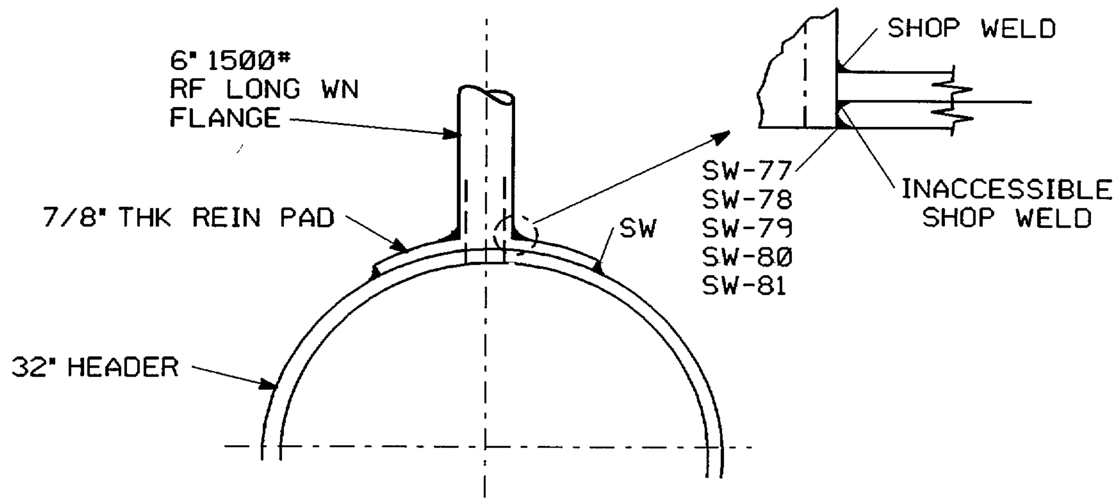
Request for Relief NDE-001 – The licensee submitted an alternative to perform surface examinations of the pipe-to-pipe fillet welds of the reinforcement pads associated with each branch connection weld. In order for the proposed alternative to be acceptable, please provide the following:

1. Please provide sketches or photos with sufficient details so that the staff could determine the impracticality in performing the Code-required surface examinations of the subject welds.

Response: The following two "Detail Sections" were taken from drawing 12050-WMKS-101A-1, which is referenced in the request for relief. They are typical of the three sets of branch connections included in NDE-001.



DETAIL A



BRANCH REINFORCING PAD
SECTION B-B

2. Please explain how inspecting the reinforcement pad's fillet welds will ensure the structural integrity of the circumferential welds in the branch connection welds.

Response: Examination of the reinforcement pad welds will provide insights into the operational history of the branch connection. If examinations of the welds joining the reinforcement pad to the pipe and the header do not show evidence of deterioration or stress, then an indication is provided that the branch connection weld is still sound. Additionally, the reinforcement pad is part of the design of the joint. For the joint to meet its design, the attachment welds need to be free of unacceptable defects. Therefore, the overall structural integrity of the joint is dependent on both the attachment fillet welds and the branch connection weld. Please note that while Section XI does not require the examination of the reinforcement pad as part of a piping examination, it does require the examination of the fillet welds associated with a reinforcement pad used on a vessel (Table IWC-2500-1, Item C2.31). Additionally, please note that if through-wall cracking does occur in the branch connection concealed by reinforcement pad, the leakage will be able to access the exterior of the piping system by way of the "weep hole" in the reinforcement pad. This leakage will be detected as part of the Code required system leakage test.

Request for Relief NDE-002 – The licensee proposes to perform a surface examination of the accessible portions of the circumferential and longitudinal welds to the extent and frequency described in IWC-2500. A remote visual examination (VT-1) of the I.D. of the pump casing welds will be performed only if

the pump is disassembled for maintenance. In order for the proposed alternative to be acceptable, please provide the following:

1. The licensee proposes a remote visual examination (VT-1) of the I.D. of the pump casing welds only if the pump is disassembled for maintenance. Please explain why a remote visual examination of the inside surface of the pump casing could not be performed using a boroscope while the pump is assembled.

Response: Access for examination of the casing welds with a boroscope is not possible if the pump is assembled. The only possible route for a boroscope is through two plugged 1/2-inch openings located on the discharge of the pump assembly. However, because of their location on the pump, distance to the welds of interest, and the obstructions resulting from the installed pump, these openings do not provide an examination opportunity for a boroscope. Even if the pump was partially disassembled to obtain limited access for a boroscope, the examination would still remain ineffective, because of the obstructions created by the installed pump components.

Request for Relief NDE-003 – The licensee proposes to perform a surface examination of the accessible portions of the circumferential and longitudinal welds to the extent and frequency described in IWC-2500. A remote visual examination (VT-1) of the I.D. of the pump casing welds will be performed only if the pump is disassembled for maintenance. In order for the proposed alternative to be acceptable, please provide the following:

1. The licensee proposes a remote visual examination (VT-1) of the I.D. of the pump casing welds only if the pump is disassembled for maintenance. Please explain why a remote visual examination of the inside surface of the pump casing could not be performed using a boroscope while the pump is assembled.

Response: Access for examination of the casing welds with a boroscope is not possible if the pump is fully assembled. (Unlike the Outside Recirculation Spray Pumps, the Low Head Safety Injection Pumps do not have a similar one-half inch opening.) Even if the pump was partially disassembled to obtain limited access for a boroscope, the examination would still remain ineffective, because of the obstructions created by the installed pump components.

Request for Relief NDE-005 – The licensee proposes to use the Automated Vessel Examination tool, which establishes its own reference system. In order for the proposed alternative to be acceptable, please provide the following:

1. The licensee states in its basis for requesting relief that this alternative reference system is well established in the industry and provides an acceptable level of quality and safety. Please explain this.

Response: Electronic encoding systems have been in use for the reactor vessel examinations by Dominion and the industry for over a decade. Dominion has not had any concern raised in the past over the use of the system from its own staff, the vendor, the ANII, or the regulator. Dominion is unaware of an industry concern with this type of location/reference system. It is Dominion's position that the electronic referencing system used by the Automated Vessel Examination Tool provides an acceptable level of quality and safety. This alternative system can locate welds with sufficient repeatability for future examinations. Therefore, it will satisfy the objectives of IWA-2600.

2. The licensee requested this relief under 10 CFR 50.55a (3). There is no such section in 10 CFR 50.55a. Please clarify.

Response: Relief is requested under the provisions of 10 CFR 50.55a(a)(3)(i).

Request for Relief No. NDE-006 - Pursuant to 10 CFR 50.55a(a)(3), the licensee requested relief from performing the Code-required volumetric examination of essentially 100% of the shell-to-flange weld in the reactor vessel.

1. The licensee requested this relief under 10 CFR 50.55a(3). There is no such section in 10 CFR 50.55a.

Response: Relief is requested under the provisions of 10 CFR 50.55a(a)(3)(i).

2. The licensee referenced Table IWA-2500-1 in its basis section. No such Table exists in the Code. Please clarify this.

Response: The correct reference is Table IWB-2500-1.

Clarification of relief: Dominion's Request for Relief NDE-006 requests permission to defer the examination required by Note 3 to Table IWB-2500-1 to the third period. Note 3 requires that, as a minimum, a partial examination of 50% of the shell-to-flange weld be performed in the first period. The remainder of the examination of the shell-to-flange weld may be deferred to the third period, if this partial examination is performed. The result of Dominion's request is to perform essentially 100% of the shell-to-flange weld in the third period.

Request for Relief NDE-010 – NAPS 2 proposes to use Code Case N-532, with the clarification of the term "corrective action," in the implementation of its Section XI third interval inspection ISI Plan. In order for the proposed alternative to be acceptable, please provide the following:

1. The licensee requested this relief under 10 CFR 50.55a (3). There is no such section in 10 CFR 50.55a. Please clarify.

Response: Relief is requested under the provisions of 10 CFR 50.55a (a)(3)(i).

Request for Relief NDE-012 – The licensee proposed to use Code Case N-586. In order for the proposed alternative to be acceptable, please provide the following:

1. The alternative requires that an engineering evaluation be performed to determine:

    a) the root cause of the failure or other relevant conditions – please describe the kinds of engineering evaluation that will be performed to determine the root cause of the failure. Is this methodology approved by the staff or the industry standards? Is there any documentation associated with the evaluation?

    b) the applicable service conditions and degradation mechanisms to establish that the affected welds, area, or supports will perform their intended safety function during subsequent operation – Does their intended safety function include both passive and active functions during design basis accidents in addition to subsequent operations?

    c) the additional welds, areas, or supports, subject to the same root cause conditions or degradation mechanisms – Has the licensee developed a procedure or protocol on how to assess the same root cause conditions or degradation mechanisms in other welds?

2. The licensee requested this relief under 10 CFR 50.55a (3). There is no such section in 10 CFR 50.55a. Please clarify this.

Response: Based on the position of the NRC expressed in DG-1112, Dominion withdraws Request for Relief NDE-012.

Request for Relief NDE-013 – NAPS 2 proposed to use the requirements of Code Case N-598, "Alternative Requirements to Required Percentages of Examinations," dated March 2, 1998. In order for the proposed alternative to be acceptable, please provide the following:

1. The licensee requested this relief under 10 CFR 50.55a (3). There is no such section in 10 CFR 50.55a. Please clarify this.

Response: Relief is requested under the provisions of 10 CFR 50.55a (a)(3)(i).

Request for Relief NDE-015 – NAPS 2 will implement the requirements of Code Case N-622, "Ultrasonic Examination of RPV and Piping, Bolts, and Studs," dated February 26, 1999, Appendix IV, paragraph 3.2(a) and 3.2(b) as "sizing acceptance criteria" for the Appendix VIII demonstrations associated with clad-to-base metal interface testing of the reactor vessel. In order for the proposed alternative to be acceptable, please provide the following:

1. Provide justification why using the RMS error calculation in accordance with Code Case N-622 will provide an acceptable level of safety and quality.

Response: Based on the position of the NRC expressed in DG-1112, Dominion withdraws Request for Relief NDE-015.

Request for Relief SPT-002 – The licensee will examine the isolation valves in the normally closed positions for leaks and evidence of past leakage. Also, the licensee will visually inspect the valves during pressure testing and monitor the system leak rate and the containment atmosphere radioactivity. In order for the proposed alternative to be acceptable, please provide the following:

1. It is not clear if this relief request is for the system hydrostatic testing or system leakage-testing requirement. The Examination category B-P, Item Numbers B15.50 and B15.70 require system leakage testing. Sections II and IV of the relief request identify this to be hydrostatic testing, while Section V proposed activities associated with system leakage testing. Please clarify.

Response: The request for relief is from the system leakage test requirements of Category B-P, Item numbers B15.50 and B15.70.

2. In Section IV, 7th paragraph, the licensee refers to IWA-4500(b)(5) of the ASME Section XI. No such item exists in the Code. However, IWA-4540(b)(5) discusses the exclusion of < 1 inch piping and valves for hydrostatic testing. Please clarify.

Response: The correct reference is to paragraph IWA-4540(b)(5).

3. It is stated in the basis that stroking of the inboard valves has been performed while the RCS was pressurized. This test revealed that when the upstream valve was stroked, the downstream valve tended to lift due to the motive force of the stream. Please explain this phenomenon and how it supports this relief request. Does this plant safety analyses credit or require both valves?

Response: The involved pilot-operated solenoid valves have a tendency to open spuriously in response to a sudden increase in supply side pressure at the valve inlet. The problem is most severe when the first of two valves mounted in series opens rapidly, permitting full supply pressure to be sharply introduced to the second valve. In the reactor vent application, if full RCS pressure is suddenly applied to the second valve, it may open suddenly and re-close after a few seconds.

In a closed, de-energized valve, inlet pressure (Ps), entering radially, provides an upward force on the piston portion of the main disc. Control pressure (Pc) acting in opposition, negates this lifting force and additionally provides the valve a closure force by its effect on the disc port area. With the pilot valve closed, Pc equals Ps. At the introduction of an inlet pressure surge, supply pressure is momentarily higher than control pressure, until control pressure re-establishes equality with supply pressure by flow of fluid through the inlet orifice. Consequently, there is a time delay in equalization of these pressures. Should the lifting force exceed the closure forces, the valve will lift. The valve will remain open until the downward force overcomes the lifting force, where upon the valve closes. This technical explanation establishes the cause of the opening of the second valve.

As stated in the request for relief, the opening of the second valve has been documented by testing. The testing and the explanation support the concern of the request for relief that testing of these valves may result in the inadvertent release of RCS coolant into the refueling cavity.

Between each of the two sets of valves and the RCS there is a 3/8-inch orifice that maintains the integrity of the Class 1 boundary i.e., the leakage through the 3/8-inch opening is within the makeup capacity of one charging pump. The SOV valves were added to maintain positive control of RCS inventory. The piping and valves downstream of the orifices were design as ASME Class 2. The ISI program upgraded these components to Class 1 as permitted by IWA 1320(c).

4. The licensee states in the basis that these valves should not be stroked for reasons of routine operation while the RCS is pressurized. Please explain why.

Response: The stroking of these valves while the RCS is pressurized could result in an unnecessary release of reactor coolant into the reactor vessel refueling cavity.

Request for Relief SPT-005 – The applicable Technical Specification requirements will be satisfied through the third interval inspection program. The incore sump room has a level alarm in the control room requiring operator action. A VT-2 visual examination will be conducted when containment is at atmospheric conditions each refueling outage for evidence of boric acid corrosion. In order for the proposed alternative to be acceptable, please provide the following:

1. The licensee states that performing VT-2 examination during system leakage test complicates the situation due to the limitation of 30-minute capacity of the breathing apparatus under sub-atmospheric pressure conditions. However, similar situation does not exist for satisfying the Technical Specification requirements under the atmospheric conditions during each refueling outage. Please provide more detail relating to the limitation of 30-minutes capacity breathing apparatus and discuss the hardship in terms of radiation exposure without compensating increase in safety.

Response: The hardship arises less from the time constraint created by the use of bottled air or the involved radiation levels, but rather more from conditions that exist during Mode 3 of reactor operation. During Mode 3 the reactor coolant system is at the operational temperature of $\geq$ 350°F, and the containment is sub-atmospheric. Performing the examination at Mode 3 is complicated by the following factors:

- The need to use a self-contained breathing apparatus (SCBA) with a full-face respirator. The weight of the bottle is approximately 25 pounds.

- Having to access the bottom of the vessel under sub-atmospheric conditions which requires the examiner to descend several levels by ladders and to navigate a small, 2'-7.25" by 2'-0" hatch way wearing the SCBA.

- The physical environment caused by the heat generated by a vessel elevated to a temperature of $\geq$ 350°F coupled with a lack of ventilation.

These factors increase the safety hazard associated with the examination. At the very least the examiner is forced to perform under considerable burden. To place the examiner under this increased risk and burden is not justified. This combination of conditions does not exist during the refueling outage when the proposed alternative examination would take place. The proposed alternate

examination would be performed under conditions that are safer and allow for a more thorough examination.

During operations, the Technical Specifications (TS) require the monitoring of reactor coolant leak rate. No identified pressure boundary leak can exist during operation and leakage from unidentified sources cannot exceed 1.0 GPM. Also, radiation monitors (gas and particulate) would respond to an increase in detectable leakage. These TS requirements provide for ongoing monitoring for leakage during the operating cycle and for decisive correction action if an issue develops. As for direct visual examination, any leakage is expected to leave boron crystal residue that can be identified by a VT-2 visual examination performed during the refueling outage. The frequency of the proposed visual examination is the same as the system leakage test required by the Code.

The monitoring methods of the station and the VT-2 visual examination of the area each refueling outage provide an acceptable level of quality and safety. Because of the burden and potential safety challenges caused by the sub-atmospheric conditions of the containment, the Code required examinations at the bottom of the reactor vessel during system leakage tests, results in a hardship without a compensating increase in quality and safety over the proposed alternative.

2. The licensee proposes that surveillance requirements that monitor the leakage and radiation levels under the Technical Specification will be satisfied through the third inspection interval. Please provide details of these activities, including the frequency and monitoring parameters, so that a reasonable assurance of the pressure boundary integrity on these partial welds can be achieved.

Response: Current Technical Specifications establish the following requirements and limits for leakage during modes of operation 1 through 4:

1. Every 72 hours, during steady state operation, the reactor coolant system leak rate is monitored to assure the limit of one gallon per minute unidentified leakage is maintained.

2. Every 12 hours the containment atmosphere particulate radioactivity is monitored.

3. No pressure boundary leakage is allowed and only one (1) gallon per minute of unidentified leakage is allowed.

Dominion has submitted a request to the NRC to change its current Technical Specifications to the plant specific Improved Technical Specifications (ITS). In this revision of the specifications, it is no longer required that the containment atmosphere particulate radioactivity be monitored every 12 hours. The proposed

ITS requires that "One containment atmosphere radioactivity monitor (gaseous or particulate)" be operable. The monitoring of the reactor coolant system leak rate every 72 hours during steady state operation remains a requirement of ITS, as do the limits on leakage.

Request for Relief SPT-006 – The licensee proposes to use Code Case N-533-1. In order for the proposed alternative to be acceptable, please provide the following:

1. The licensee states in its basis for relief "Secondly, most of the involved connections are tested at elevated temperature." Please explain this statement addressing the following concerns: (a) the meaning of "most of the involved connections" (i.e., what percentage of involved connections are not subjected to this testing and what alternative activities are performed for those connections not subject to such testing), and (b) the meaning of "tested at elevated temperatures" (i.e., what are these tests and how these tests provide a reasonable assurance for the leakage integrity of these bolted connections).

Response: The reference sentence was meant to convey that if the testing is performed as part of the Code specified system leakage test, the test would be conducted during operation at nominal operating pressure and temperature. For many of the pipe sections or components, the operational temperature, and, therefore, the required test temperature, would be elevated (i.e. well above ambient and in a range that could be harmful to humans if accidental contact with the piping or component was to occur). The sentence does not describe an alternative test of the bolted connections. Dominion proposes no alternative testing other than that specified by Code Case N-533-1.

2. The licensee requested this relief under 10 CFR 50.55a (3). There is no such section in 10 CFR 50.55a. Please clarify.

Response: Request to use Code Case N-533-1 is requested under the provisions of 10 CFR 50.55a(a)(3)(i).

Request for Relief SPT-007 – The licensee will examine the isolation valves in the normally closed positions for leaks and evidence of past leakage. Also, the licensee will visually inspect the valves during pressure testing and monitor the system leak rate and the containment atmosphere radioactivity. In order for the proposed alternative to be acceptable, please provide the following:

1. It is not clear if this relief request is for the system hydrostatic testing or system leakage testing requirement. The Examination Category B-P, Item

Numbers B15.50 and B15.70 require system leakage testing. Sections II and IV of the relief request identify this to be hydrostatic testing, while Section V proposes activities associated with system leakage testing. Please clarify.

Response: The request for relief is from the system leakage test requirements of Category B-P, Item numbers B15.50 and B15.70.

2. The licensee requested this relief under 10 CFR 50.55a (3). There is no such section in 10 CFR 50.55a. Please clarify.

Response: Relief is requested under the provisions of 10 CFR 50.55a(a)(3)(i).